

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-049823

(43)Date of publication of application : 21.02.2003

(51)Int.Cl. F16C 11/04

H04N 5/225

H05K 5/02

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(54) ROTATING HINGE MECHANISM AND ELECTRONIC APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To attain significant improvement in design flexibility in routing the wiring which electrically connects a section between a body part of an electronic apparatus and a rotating part attached to the body part thereof so as to be rotatable.

SOLUTION: In these rotating hinge mechanism and electronic apparatus, the body part 2 of the electronic apparatus 1 and the rotating part 3 rotatably attached to the body part 2 are supported so as to be rotatable each other. There are provided a fixed member 21, which includes a through-hole 23 for inserting the wiring 29 electrically connecting the section between the body part 2 and the rotating part 3, and is attached to one side 3a of the body part 2 and the rotating part 3, and a rotating member 22, which is attached to the periphery of the through-hole 23 of the fixed member 21 and to the other side 2a of the body part 2 and the rotating part 3. This can significantly improve design flexibility in routing the wiring 29, such as a through-hole 23 capable of being formed eccentrically from a rotational center S of the body part 2 of the fixed member 21 and the rotating part 3, and a plurality of through-holes to be drilled.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1] In the rotation hinge device which supports mutually the body section of electronic equipment, and the rotation section attached in this body section pivotable While being attached in the perimeter of the through tube of the holddown member which has the through tube in which wiring which connects electrically between the above-mentioned body section and the above-mentioned rotation sections is inserted, and was attached in the one side of the above-mentioned body section and the above-mentioned rotation section, and the above-mentioned holddown member pivotable The rotation hinge device characterized by having the rotation member attached in the other side of the above-mentioned body section and the above-mentioned rotation section.

[Claim 2] The above-mentioned through tube is a rotation hinge device according to claim 1 characterized by being prepared in the location which carried out eccentricity from the center of rotation of the above-mentioned body section of the above-mentioned holddown member, and the above-mentioned rotation section.

[Claim 3] The above-mentioned through tube is a rotation hinge device according to claim 2 characterized by preparing more than one in the above-mentioned holddown member.

[Claim 4] Wiring which connects electrically between the body section, the rotation section attached in the above-mentioned body section pivotable, and the above-mentioned body sections and the above-mentioned rotation sections, It has the rotation hinge device which supports mutually the above-mentioned body section and

the above-mentioned rotation section pivotable. The above-mentioned rotation hinge device While being attached in the perimeter of the through tube of the holddown member which has the through tube in which the above-mentioned wiring is inserted, and was attached in the one side of the above-mentioned body section and the above-mentioned rotation section, and the above-mentioned holddown member pivotable Electronic equipment characterized by having the rotation member attached in the other side of the above-mentioned body section and the above-mentioned rotation section.

[Claim 5] The above-mentioned through tube is electronic equipment according to claim 4 characterized by being prepared in the location which carried out eccentricity from the center of rotation of the above-mentioned body section of the above-mentioned holddown member, and the above-mentioned rotation section.

[Claim 6] The above-mentioned through tube is electronic equipment according to claim 5 characterized by preparing more than one in the above-mentioned holddown member.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the electronic equipment by which the rotation section was attached in the body section pivotable by equipping with such a rotation hinge device the rotation hinge device and list which support the body section and the rotation section pivotable mutually.

[0002]

[Description of the Prior Art] There is some electronic equipment by which the camera section 101 was attached in the body section 102 pivotable like the pocket mold video camera 100 shown in drawing 10 and drawing 11 .

[0003] In this pocket mold video camera 100, the camera section 101 has the manual operation button 105 at the viewfinder 104 and the tooth-back side in the upper part by the side of the tooth back which counters the upper part by the side of a transverse plane with the image pick-up lens 103 and this image pick-up lens 103. It is possible to display the image which the body section 102 has the liquid crystal display panel 106 in the tooth-back side, and was picturized through the image pick-up lens 103 by this liquid crystal display panel 106 on the other hand besides viewfinder 104 of the camera section 101.

[0004] Moreover, the camera section 101 and the body section 102 are mutually supported pivotable by the rotation hinge device prepared in the interior.

[0005] Concretely, as shown in drawing 12 and drawing 13 , this rotation hinge device has the revolving shaft 107 attached in the camera section 101 side, and the stationary plate 108 attached in the body section 102 side, and has the structure where the revolving shaft 107 was attached in the stationary plate 108 pivotable.

[0006] The revolving shaft 107 is presenting the whole abbreviation tubed which has a through tube 109 to the core, and a flange 110 covers the perimeter, and is projected and formed in the periphery section. And this revolving shaft 107 is attached in the camera section 101 side by a flange's 110 being contacted by case 101a and fixing it with two or more screws 111 while it engages with engagement hole 101b drilled in case 101a of the camera section 101.

[0007] On the other hand, the stationary plate 108 is presenting abbreviation plate-like, and from the both ends, the fixed piece section 112 of a pair projects and it is formed. And this stationary plate 108 is attached in the body section 102 side by the fixed piece section 112 of a pair being contacted by case 102a of the body section 102, and being fixed to it with two or more screws 113.

[0008] Moreover, the revolving shaft 107 is attached in the stationary plate 108 pivotable. The engagement hole 114 with which a revolving shaft 107 is engaged is concretely drilled in the core of a stationary plate 108, and opening 102b which the revolving shaft 107 which engaged with the engagement hole 114 of this stationary plate 108 faces is drilled in case 102a of the body section 102. And while a revolving shaft 107 engages with the engagement hole 114 of this stationary plate 108 and a flange 110 is contacted by the stationary plate 108, the approximate circle annular pressure plate 116 by which fitting is carried out to a revolving shaft 107 through a spacer 115 is contacted by the stationary plate 108, and is being fixed to the flange 110 with two or more screws 117. A flange 110 and a pressure plate 116 will be in the condition of having put the stationary plate 108, by this, and a revolving shaft 107 is pivotable to a stationary plate 108.

[0009] Moreover, the perimeter is covered, the slot 118 is formed in the field contacted with the stationary plate 108 of a flange 110, and the spring member 120 which energizes the approximate circle annular click sheet metal 119 by which fitting is carried out to a revolving shaft 107 to a stationary-plate 108 side is arranged in the interior of this slot 118.

[0010] By this rotation hinge device, if the camera section 101 rotates to the body section 102, while the click sheet metal 119 and a stationary plate 108 ****, the engagement crevice formed in the stationary plate 108 in the predetermined rotation location and the engagement heights formed in the click sheet metal 118 will be engaged. While this gives moderate friction at the time of rotation, it is possible to give a feeling of a click in a predetermined rotation location, and to hold the camera section 101 in the body section 102.

[0011] Moreover, it is possible to connect electrically between the camera section 101 and the body sections 102 by this rotation hinge device with the wiring 121

inserted in a through tube 109 and opening 102b.

[0012] As mentioned above, when a rotation hinge device supports the camera section 101 and the body section 102 pivotable mutually in the pocket mold video camera 100, it is possible to change the sense of the camera section 101 in the direction shown in drawing 11 and the drawing 12 Nakaya mark Y to the body section 102.

[0013]

[Problem(s) to be Solved by the Invention] By the way, by the rotation hinge device mentioned above, it had to let the through tube 109 prepared in the core of a revolving shaft 107 pass, wiring 121 which connects electrically between the camera section 101 and the body sections 102 had to be taken about, and there was a problem of it becoming impossible for such constraint to design electronic equipment freely.

[0014] That is, it was very difficult to have to perform the design in consideration of leading about of the wiring 121 inserted in the through tube 109 always prepared in the core of a revolving shaft 107 by electronic equipment equipped with such a conventional rotation hinge device, and to attain the further miniaturization by such constraint.

[0015] Moreover, by the conventional rotation hinge device mentioned above, the wiring 121 inserted in the through tube 109 of a revolving shaft 107 will **** to the inner skin of a through tube 109 with rotation of a revolving shaft 107. For this reason, by the conventional rotation hinge device, the guard member 122 for protecting wiring 121 is continued and formed in the perimeter of the inner skin of a through tube 109.

[0016] However, since the path of a through tube 109 became large by preparing such a guard member by the conventional rotation hinge device, this rotation hinge device itself became large, and the miniaturization of the further electronic equipment was difficult.

[0017] Then, this invention is proposed in view of such a conventional situation, and aims at offering the rotation hinge device which raised sharply the design degree of freedom of leading about of wiring which connects electrically between the body section of electronic equipment, and the rotation sections attached in this body section pivotable.

[0018] Moreover, this invention aims at offering the electronic equipment which enabled the further miniaturization while it raises the degree of freedom of a design by having such a rotation hinge device.

[0019]

[Means for Solving the Problem] In order to attain the purpose mentioned above, the rotation hinge device concerning this invention It is what supports mutually the body section of electronic equipment, and the rotation section attached in this body section pivotable pivotable. While being attached in the perimeter of the through tube of the holddown member which has the through tube in which wiring which connects

between the body section and the rotation sections electrically is inserted, and was attached in the one side of the body section and the rotation section, and a holddown member pivotable. It is characterized by having the rotation member attached in the other side of the body section and the rotation section.

[0020] As mentioned above, by the rotation hinge device concerning this invention, it becomes possible from the rotation member being attached in the perimeter of the through tube of a holddown member pivotable to prepare a through tube in the location which carried out eccentricity from the center of rotation of the body section of a holddown member and the rotation section, for example, or to prepare two or more such through tubes, and it becomes possible to raise sharply the design degree of freedom of leading about of wiring.

[0021] Moreover, since wiring inserted in the through tube of a holddown member does not **** to the inner skin of this through tube when a rotation member rotates, it is flat and it becomes possible [also connecting between the body section and the rotation sections electrically using a wire rod like a flat cable which has flexibility], for example.

[0022] Moreover, the rotation section attached pivotable [the electronic equipment concerning this invention] in the body section and the body section, It has the rotation hinge device which supports mutually wiring which connects between the body section and the rotation sections electrically, and the body section and the rotation section pivotable. A rotation hinge device It is characterized by having the through tube in which wiring is inserted and having the holddown member attached in the one side of the body section and the rotation section, and the rotation member attached in the other side of the body section and the rotation section while being attached in the perimeter of the through tube of a holddown member pivotable.

[0023] As mentioned above, by the electronic equipment concerning this invention, it becomes possible in a rotation hinge device to prepare a through tube in the location which carried out eccentricity from the center of rotation of the body section of a holddown member, and the rotation section, for example from the rotation member being attached in the perimeter of the through tube of a holddown member pivotable, or to raise sharply the design degree of freedom of leading about of wiring of preparing two or more such through tubes.

[0024] Moreover, since wiring inserted in the through tube of a holddown member does not **** to the inner skin of this through tube when a rotation member rotates, it is flat and it becomes possible [also connecting between the body section and the rotation sections electrically using a wire rod like a flat cable which has flexibility], for example.

[0025]

[Embodiment of the Invention] Hereafter, the rotation hinge device and electronic equipment which applied this invention are explained to a detail with reference to a drawing.

[0026] Electronic equipment equipped with the rotation hinge device which applied this invention is the digital still camera (henceforth a digital camera) 1 which records this photoed image data on the disk-like record medium contained by the disk cartridge while photoing a digital image, as shown in drawing 1 .

[0027] This digital camera 1 is equipped with the body section 2 and the camera section 3 which is the rotation section attached pivotable to this body section 2 as shown in drawing 1 and drawing 2 .

[0028] The body section 2 has the image display unit 4 for displaying the image picturized by the camera section 3, as shown in drawing 3 thru/or drawing 5 , and the liquid crystal display panel (LCD) which is not illustrated is prepared in the tooth-back side. Moreover, the body section 2 has the image recording unit 5 for recording the image data picturized by the camera section 3. This image recording unit 5 is arranged at the front-face side of the body section 2, and has the manual operation button 8 grade for performing playback or edit of image data recorded on the closing motion carbon button 7 for carrying out switching operation of the disk insertion-and-detachment section 6 and this disk insertion-and-detachment section 6 for inserting [disk cartridge / which was mentioned above], and the disk-like record medium. Furthermore, a shutter release 9 and the various manual operation buttons (switch) of the mode circuit changing switch 10 and zoom circuit changing switch 11 grade are prepared in this body section 2.

[0029] The camera section 3 has the image pick-up unit 12 for picturizing an image, and the image pick-up lens 13 is formed in the edge by the side of the upper part. Moreover, image sensors (not shown), such as CCD (Charge Coupled Device), are formed in the interior of this image pick-up unit 12, the image captured through the image pick-up lens 13 is changed into an electrical signal, and it is made as [record / on the disk-like record medium mentioned above / output to the image recording unit 5 of the body section 2 as image data, and]. Moreover, the picturized image data is displayed on the liquid crystal display panel of the image display unit 4.

[0030] And this camera section 3 can be rotated to the body section 2 in the direction shown in the drawing 6 Nakaya mark X by operating the control lever 14 prepared in the lateral portion shown in drawing 6 . That is, in this digital camera 1, the body section 2 and the camera section 3 are mutually supported pivotable by the rotation hinge device prepared in the interior.

[0031] Concretely, as shown in drawing 7 thru/or drawing 9 , this rotation hinge device has the fixed shaft 21 attached in the body section 2 side, and the rotor plate 22 attached in the camera section 3 side, and has the structure where the rotor plate 22 was attached in this fixed shaft 21 pivotable.

[0032] The fixed shaft 21 is presenting the whole abbreviation tubed which has a through tube 23 to the location which carried out eccentricity from the core, and a flange 24 covers the perimeter, and is projected and formed in the periphery section. And this fixed shaft 21 is attached in the body section 2 side by the engagement

heights 26 formed in case 2a engaging with the engagement crevice 25 formed in the field contacted with case 2a of the body section 2, and being fixed to it with two or more screws (here four screws) 27.

[0033] Moreover, the opening 28 which a part of through tube 23 of the fixed shaft 21 faces is drilled in case 2a of the body section 2. That is, these through tubes 23 and opening 28 are opened for free passage in the location which carried out eccentricity from the center of rotation S of the body section 2 and the camera section 3. And it is possible to connect electrically between the body section 2 and the camera sections 3 with the wiring 29 inserted in these through tubes 23 and opening 28. Furthermore, the guard member 30 for protecting wiring 29 covers the inner skin faced from a through tube 23 all over removing the inner skin of opening 28, and is prepared in it.

[0034] On the other hand, the rotor plate 22 is presenting abbreviation plate-like, from the both ends, the fixed piece section 31 of a pair is bent at the case 3a side of the camera section 3, and toward the periphery, projects and is formed. And this rotor plate 22 is attached in the camera section 3 side by the fixed piece section 31 of a pair being contacted by case 3a of the camera section 3, and being fixed to it with two or more screws (here two screws) 32.

[0035] Moreover, the rotor plate 22 is attached in the direction of drawing 7 Nakaya mark X pivotable to the fixed shaft 21. Concretely, the engagement hole 33 with which the fixed shaft 21 is engaged is drilled in the core of a rotor plate 22. And while the fixed shaft 21 engages with the engagement hole 33 of this rotor plate 22 and a flange 24 is contacted by the rotor plate 22, the approximate circle annular pressure plate 35 by which fitting is carried out to the fixed shaft 21 through a spacer 34 is contacted by the rotor plate 22, and is being fixed to the flange 24 with two or more screws (here two screws) 36. Thereby, a rotor plate 22 will be in the condition of having been put by the flange 24 and the pressure plate 35, and is pivotable to the fixed shaft 21.

[0036] Moreover, the perimeter is covered, the slot 37 is formed in the field contacted with the rotor plate 22 of a flange 24, and the spring member 38 is arranged in the interior of this slot 37. And between this flange 24 and the spring member 38, the approximate circle annular click sheet metal 39 by which fitting is carried out to the fixed shaft 21 is arranged. This click sheet metal 39 is energized by the spring member 38 to the flange 24 side, and has engagement heights (not shown) in that flange 24 and the principal plane which counters.

[0037] On the other hand, the condition of having been contained by the body section 2 indicated to be the click sheet metal 39 to drawing 3 mentioned above to the principal plane which counters is made into a criteria location at a flange 24. The criteria location concerned, the location rotated in the direction of 1 at the include angle of 90 degrees from the criteria location concerned, The engagement crevice where the engagement heights of the click sheet metal 39 engage with the location

rotated in the direction of 1 at the include angle of 180 degrees from the criteria location concerned, and the location rotated in other directions at the include angle of 90 degrees from the criteria location concerned, respectively (it does not illustrate.) It is prepared.

[0038] By this rotation hinge device, if the camera section 101 rotates to the body section 102, while the click sheet metal 39 and a flange 24 ****, the engagement heights of the click sheet metal 39 and the engagement crevice of a flange 24 will be engaged in the above-mentioned rotation location. While this gives moderate friction at the time of rotation, it is possible to give a feeling of a click in the above-mentioned rotation location, and to hold the camera section 3 to the body section 2 in the above-mentioned rotation location.

[0039] Moreover, the piece sections 35a and 35b of regulation of the pair for regulating the include-angle range which the camera section 3 rotates to the body section 2 are projected and formed in the periphery section of a pressure plate 35. On the other hand, the piece section 22 of a stopper contacted by this piece section of regulation 35a is projected and formed in the rotor plate 22. And by this rotation hinge device, if the camera section 3 rotates in the direction of 1 to the body section 2, when piece section of stopper 22a of a rotor plate 22 is contacted by one piece section of regulation 35a of a pressure plate 35. If the rotation to the direction of 1 is regulated and the camera section 3 rotates in other directions to the body section 2, piece section of stopper 22a of a rotor plate 22 will be contacted by piece section of regulation 35b of another side of a pressure plate 35, and the rotation to other directions will be regulated. It is possible for this to regulate the include-angle range which the camera section 3 rotates to the body section 2 by the rotation hinge device.

[0040] When a rotation hinge device supports the body section 2 and the camera section 3 pivotable mutually in the digital camera 1 constituted as mentioned above, it is possible to change the sense of the camera section 3 in the direction shown in the drawing 6 Nakaya mark X to the body section 2. For example, it is possible to change the sense of the camera section 3 to the condition that the camera section 3 shown in drawing 4 and drawing 5 rotated at the include angle of 90 degrees to the body section 2 from the condition that the camera section 3 shown in drawing 3 was contained by the body section 2 in this digital camera 1.

[0041] In addition, it is possible to perform the change of ON/OFF of the image displayed on the liquid crystal display panel mentioned above by the rotational position sensing for detecting the location which the camera section 3 rotates in this digital camera 1 to the body section 2 prepared in the rotation hinge device, and the change of the image top displayed on a liquid crystal display panel / bottom.

[0042] By the way, by the rotation hinge device mentioned above, the rotor plate 22 is attached in the perimeter of the through tube 23 of the fixed shaft 21 pivotable. It is possible to raise sharply the design degree of freedom of leading about of wiring 29 by this, for example, it is possible to form a through tube 23 in the location which

carried out eccentricity from the center of rotation S of the body section 2 of the fixed shaft 21 and the camera section 3, or to form two or more such through tubes 23.

[0043] Moreover, by this rotation hinge device, when a rotor plate 22 rotates to the fixed shaft 21, the wiring 29 inserted in a through tube 23 and opening 28 and the inner skin of these through tubes 23 and opening 28 do not ****. For this reason, it is also possible to make small the path of a through tube 23 or opening 28 to the wiring 29 which does not necessarily need to arrange the guard member 30 mentioned above, and is inserted in. Moreover, it is possible to design freely the configuration of these through tubes 23 and opening 28. For example, as shown in drawing 7 and drawing 8, the through tube 23 is presenting the abbreviation ellipse configuration which carried out eccentricity from the center of rotation S of the body section 2 and the camera section 3. On the other hand, opening 28 is located in the edge of the through tube 23 which carried out eccentricity from the center of rotation S of the body section 2 and the camera section 3, and is presenting the shape of an abbreviation rectangle made into the minor diameter rather than this through tube 23.

[0044] Furthermore, by this rotation hinge device, a design free also about wiring 29 is possible. For example, it is flat and it is possible to connect electrically between the body section 2 and the camera sections 3 using a wire rod like a flat cable which has flexibility.

[0045] Therefore, by having the rotation hinge device mentioned above in this digital camera 1, it is possible to raise the degree of freedom of a design sharply, and it is also possible to attain the further miniaturization.

[0046] In addition, the rotation hinge device which applied this invention can also be applied to the record and/or the regenerative apparatus which are not limited when applied to the digital camera 1 mentioned above, but can apply to the electronic equipment by which the rotation section was attached in the body section pivotable widely, for example, perform record and/or playback of a picture signal, a sound signal, etc.

[0047]

[Effect of the Invention] As explained to the detail above, according to the rotation hinge device concerning this invention From the rotation member being attached in the perimeter of the through tube of a holddown member pivotable, it sets to a holddown member, for example. Wiring which it is possible from the center of rotation of the body section and the rotation section to prepare a through tube in the location which carried out eccentricity, or to prepare two or more such through tubes, and was inserted in the through tube of a holddown member Since it does not **** to the inner skin of this through tube when a rotation member rotates, it is flat and it is also possible to connect between the body section and the rotation sections electrically using a wire rod, for example like a flat cable which has flexibility.

[0048] Therefore, by having such a rotation hinge device by the potential device

concerning this invention, it is possible to raise sharply the design degree of freedom of leading about of wiring which connects electrically between the body section and the rotation sections attached in this body section pivotable, and it is also possible to attain the further miniaturization.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing a digital camera as an example of the electronic equipment which applied this invention.

[Drawing 2] It is the perspective view showing the condition that the sense of the camera section of the above-mentioned digital camera was changed.

[Drawing 3] It is the front view showing the above-mentioned digital camera.

[Drawing 4] It is the front view showing the condition that the sense of the camera section of the above-mentioned digital camera was changed.

[Drawing 5] It is the top view showing the condition that the sense of the camera section of the above-mentioned digital camera was changed.

[Drawing 6] It is the side elevation showing the above-mentioned digital camera.

[Drawing 7] It is the top view showing the configuration of the rotation hinge device which applied this invention.

[Drawing 8] It is a sectional view by drawing 7 median-line part A-A'.

[Drawing 9] It is a sectional view by drawing 7 median-line part B-B'.

[Drawing 10] It is the perspective view showing a pocket mold video camera as an example of the conventional electronic equipment.

[Drawing 11] It is the perspective view showing the condition that the sense of the camera section of the above-mentioned pocket mold video camera was changed.

[Drawing 12] It is the top view showing the configuration of the conventional rotation hinge device.

[Drawing 13] It is a sectional view by drawing 12 median-line part C-C'.

[Description of Notations]

1 Digital Camera, 2 Body Section, 2a Case by the side of Body Section, 3 Camera Section, 3a Case by the side of Camera Section, 21 Fixed Shaft, 22 Rotor Plate, 23 Through Tube, 29 Wiring
